

THE ZOOLOGIST

No. 901.—*July 15th, 1916.*

HINDU ZOOLOGICAL BELIEFS.

BY W. RAE SHERRIFFS,

Professor of Zoology, Madras Christian College.

To the British student of zoology the various animals dealt with in the college course have no meaning outside their value in the science itself. On the other hand, the Indian student of zoology cannot but remember, many a time in the course of his reading and of his work, stories of the part played by animals in the annals of his native land.

In the following pages we shall record some of the prevalent beliefs concerning animals, their uses, and the rôle they play in the mythology of South India. For this purpose, then, it will be sufficient to take the animal kingdom as divided into the two main groups, vertebrates and invertebrates, and to discuss under each phylum those animals which have a special interest for us.

INVERTEBRATES.

All the early phyla, the Protozoa, Porifera, Cœlentera, and the various groups of Worms, give us no animal of sufficient importance to be recorded in any tale or used in any particular way. That the first lot, the Protozoa, the smallest and earliest of animals, should be omitted is not surprising, for most are microscopic, and in the days when the great epics, the

Mahabharata and the *Ramayana*, were composed, such a thing as a lens was unknown. Even to this day the person who is not a zoologist or microscopist passes through life without ever seeing a Protozoon. As for the parasitic Protozoa causing diseases in man, such an idea is of quite recent date, and in India it is, of course, evil spirits that do all the mischief.

ARTHROPODA.—This is the first group of which various members come under our notice. The crustacea are represented by the little Calling-Crab (*Gelasimus*), so common in estuarine mud banks. One claw in the male is ridiculously large, bright red, and constantly waved in the air, a habit which has given to the Crab locally the name of the “dhobie” (washerman) Crab. The Centipede must not be killed, because it is believed to be the only son of its mother (women, however, are allowed to kill them); neither must Millipedes be slaughtered heedlessly, but for a very different reason, for the propitiatory sacrifices in such a case must equal in number the legs of the victim. Insects are plentiful enough in India in all conscience, and accordingly we find them alluded to for various reasons. The common “Silver-fish” insect (*Lepisma*), which proves such a nuisance in the bungalow by nibbling books and papers, is no less than the arrow of Rama. Look at the shape of its tail and see the resemblance. Another pest to the European is the Cockroach, which, however, is always made welcome by the Hindu, because it is an emblem of plenty and also brings luck. The small Grasshopper, from its bright green colour, is often called the “little Parrot.” The Mantis, so well known by its habit of reverently moving its first pair of legs as if intent on its devotions, is named the “shepherd” or the “milkman.” The common Mole-Cricket (*Gryllotalpa*) in the wet season frequently enters houses. In connection with this insect there is a curious belief. When a woman is sterile, then it is some kind of insect within her which is preventing conception. In order to destroy it another insect must be introduced alive. *Gryllotalpa* is therefore taken, rolled up in sugar (jaggery) and swallowed whole. The Mole-Cricket must never be killed, probably for this very reason, and in Tamil its name means the “child insect,” most likely because of its use as recorded here. It is harmless, and its harmlessness has become proverbial. So much, indeed, is



this the case that it is said that if an insect stings you it must be a Scorpion, but if it does not then it must be a Mole-Cricket.

As might be expected, the Butterflies, from their beauty and daintiness, are the "dancing girls" of the insect world. White Butterflies, from their clean appearance, are termed "washer-women." The Hindu has noticed the Wasp stinging the Caterpillar, but he differs very much from Fabre in his account of what really occurs. According to the Hindu, when a Wasp stings a Caterpillar, then the Caterpillar becomes a Wasp. Thus may a bad man corrupt a good one, for the Caterpillar, though at first harmless as such, after becoming a Wasp, can sting.

Bees are mentioned in tales several times. If they construct their honeycomb in a house, it bodes evil for the dwellers within its walls. Familiar to all in India is the big, handsome, blue-black Carpenter-Bee (*Xylocopa*), which is often seen in the bungalow prospecting for a hole into which it can climb to lay its eggs. This Bee figures in the well-known story of Bringi. One day a "rishi" (sage), Bringi by name, who used daily to worship Shiva, wished to worship Shiva alone. This he could not do in human form, because the god's consort, Parvati, was wont to sit on Shiva's lap. Now, as we know, the Hindu idea of worshipping is to walk round the god so many times, the oftener the more intent is the worship accorded. Bringi's difficulty, then, was how to get round Shiva, whom he wished to honour, without at the same time encompassing Parvati, and thus doing equal homage to both. Bringi bethought himself of changing into this Bee, and did so, flying round Shiva and then boring between him and Parvati. Both the deities at once saw through the trick; Shiva felt complimented by the rishi's devotion to himself, but the lady was very angry. In fact, she grumbled so much at the disrespect shown her, that, in order to pacify her, and to prevent a recurrence of the incident, Shiva incorporated her body with his own. From that day he became Arthanari—i.e. half-woman—so that, as thus represented, Shiva has one side of his mouth with the moustache, the other without, one arm that of a man, while the other is slender and adorned with bangles.

This change from the human form to that of a Bee also enters into the tale of King Mahabali, whose ancient home, Mahabalipuram—better known perhaps as the Seven Pagodas—

is some thirty-five miles south of Madras. Vishnu is said to have visited this earth of ours several times, in each case to right wrong, and on two of these occasions a Bee plays a conspicuous part in the story.

Mahabali was one day performing a sacrifice (yaga), at which time every desire of a visitor must be granted. In order to test him, Vishnu took the form of a dwarf (Vamana) and entered the hermitage where the king was. Appearing before the Raja, Vishnu asked, as a reward for the performance of austerities, as much ground as he could cover with three steps. Mahabali, being a great king and deceived by the size of his small visitor, readily granted the request, notwithstanding the advice of his "guru" (spiritual adviser), Sukrachariar by name, who recognised the god and saw that he plotted to ruin the king. In performing the yaga, water is poured from a small vessel (gindi or muku chembu) into the outstretched hands of the visitor while the request is granted. In order to prevent the water escaping from the vessel, the guru at once changed himself into a Bee, and flew up the spout of the cup, thus stopping the flow of water and preventing the gift being made. Vishnu knew quite well who the Bee was, and poked it out with a little stick. In so doing he unfortunately knocked out one of the Bee's eyes, so that ever after the guru was blind of an eye, and even to this day a one-eyed man is referred to as Sukrachariar.

The small black Ants which swarm everywhere throughout the plains are specially connected with Ganesa. For this reason it is very sinful to kill them. Ganesa (the Elephant or belly god) is said to be very fond of the white sweetmeats (korokottai) sold in the bazaars, and the Ants resemble him in that they are frequently seen moving about carrying their small white "eggs."

The Scorpion is popularly believed to liberate its young by bursting its back, an idea obviously due to the fact that the mother Scorpion often carries her young on her back. Ganesa is said to send a Scorpion to sting anyone who has offended him. When you see the Scorpion approaching, you have only to repeat the god's name, when it will stop and not harm you. That is the theory, but in actual practice we believe that it does not work.

The Head-Louse is only too common in India, and hunting for these vermin on each other seems to be the sole recreation that the ordinary coolies have. It is interesting to note that if one falls to the ground in Madras it is certain to go north, west, or south, but never east, because then it would certainly before long fall into the sea.

The beautiful Harvest-Mite (*Trombidium*), with its body seemingly made of red velvet—indeed, the Tamil name means “velvet insect”—has a quaint story as to its origin. Sita one day was chewing betel, and on expectorating on the ground, what was her delight to find that the unsightly mark moved away as the lovely Red-Mite.

MOLLUSCA.—The Lamellibranchs (bivalves) are not mentioned as such, but as they are the pearl-producing group we may note that pearls are said in India to arise in three ways: (1) From the Crab or Oyster (the Tamil name for both these is the same, so that the South Indian is certainly not a zoologist), (2) from the hollow stem of the bamboo, (3) from the Elephant's tusks. These are the places where you may confidently expect to find pearls. As to how they ever got there—well, as Mr. Kipling says, “that's another story.” Only, remember that the best pearls come from the Elephant's tusks.

Requienia ammonia has its small right valve fitted on like an operculum. These stony valves are picked up on the beach at Rameswaram in large numbers, and pilgrims to that famous shrine usually buy them and bring them home as curios to be distributed among friends and relatives as a souvenir of the holy place. To the Hindu these little things are the eyes of the demon Ravana, King of Lanka (Ceylon), who fought against Rama, one of the “avatars” (appearances on this earth) of Vishnu. In the personal conflict between the champions in Lanka, Rama had cut off Ravana's ten heads a thousand times, but no sooner was one head severed than it was regrown. Rama was unable to conquer so long as Ravana's heart contained the holy nectar (amritha), but whenever Rama's arrow pierced his heart and broke there the vessel containing the nectar, then the heads ceased to grow. As Ravana had a pair of eyes in each of his ten heads, all of which were cut off a thousand times, he left twenty thousand eyes behind him on the shore, and as all

the rest of his frame has disintegrated long ago, only those eyes now remain. Of this there is no doubt, for the brown marks on the valves, are they not the stains of the blood shed in the mighty conflict?

The most important Mollusc is undoubtedly the Chank (*Turbinella rapa*), which is of special interest from its connection with the religion of the Hindu. Diving for these shells forms a fishery of considerable value in South India under the control of the Government Fisheries Department, with its headquarters at Tuticorin. The Chank is one of the weapons of Vishnu, who is always represented as holding it in his left hand, while in his right he grasps the "chuckram." The Chank is the symbol both on the postage-stamps and on the coinage of Travancore, while the coin is the chuckram. On the stamps of the first issue of Cochin the Chank is represented along with other objects.

The common Chank shell is dextral, *i.e.* the opening faces to the right of the holder when looking into it with the apex of the shell pointing upwards. The sinistral condition, *i.e.*—with the opening to the observer's left—is very rare. The "Cambridge Natural History" (vol. iii, p. 100) records from Thurston that in 1887 a sinistral form obtained in Jaffna was purchased for 700 rupees. Popularly, the relative values of Chank shells are as follows: The common form sells at about 1 rupee per dozen, the sinistral is worth one thousand times this sum, while it is in turn only a thousandth part of the value of a special form (*salanjalam*), which again is only a thousandth part of the value of the Chank which Vishnu himself wields, which is the only one of its kind in the universe. On this enumeration, Vishnu's Chank (*panchajanyam*) is worth a thousand million times the value of a common Chank, a sum somewhere about £5,500,000 approximately. Of course, these two last shells are purely mythical.

The uses of the Chank are various. Many are cut transversely into slices, which are used as bangles by Indian women. The Chank is used in temples for pouring libations over the god. It is a sacred emblem. The ordinary form is employed in all Hindu homes as a feeding-cup for children, and also in ceremonies as the vessel from which the libation is poured. It is also used as a trumpet, both at weddings and at funerals, at

which its note is supposed to reach heaven, and prepare by its onward ripplings the way for the soul in its flight from earth.

The Snail is the common Gasteropod mollusc, and he is the little man who carries water for the Snake, which will eat him if he does not. This is why the Snail moves so slowly. He is afraid to spill the water he carries in his shell.

The Cephalopoda, as represented by the Cuttle-fish, are very common in Indian seas. The internal shell is often washed ashore on the sandy beach at Madras. This shell is said sometimes to be taken inland as a curio from Rameswaram, and is believed to be made of the sea-foam, like the meerschäum of the Baltic. The cuttle-bone is used for various purposes, for cleaning slates and harness, for example.

ECHINODERMA.—This phylum has no members about which stories are current. The thick spines of a Sea-Urchin* are sometimes used by schoolboys as slate-pencils. It is noteworthy that phyla of characteristically marine animals—*e.g.* Porifera, Cœlentera, and Echinoderma—do not figure in this record. The early Hindus knew nothing of the sea and its animal denizens. At the present time the great bulk of the population of India has never seen the sea. To them it is a mere name. Probably the fishers round the coasts, who form a community by themselves, may have many tales of life in the ocean, for they go down to the sea in catamarans, at least in Madras, but any such tales are unknown to land-folk.

VERTEBRATES.

These include all the larger and better known creatures, so that in enumerating stories connected with fishes, amphibians, reptiles, birds, and mammals, our difficulty is not so much to find matter as to select from a mass of mythological lore what is really relevant.

FISHES.—The great majority of fishes are marine, and of them we can find nothing worthy of being recorded. The fish-shape, especially that of *Barbus* (a common fresh-water fish of the Carp family in South India), is much admired. To have eyes fish-like in shape is considered a type of beauty, and this form is got by blackening the eyelids with material obtained by

* Stomopneustes.

charring rice, mixing it with "ghee" (clarified butter), and extending the mark as the tail of the fish on to the cheek. Meenakshi, a favourite Tamil name for a girl, means fish-eyed.

It is related that the patriarch Manu (Noah of the Scriptures) caught a small fish which begged for its life and promised a reward for its preservation. Manu thereupon put it back again into the water. When the great deluge came and he took refuge in the ark, the friendly fish reappeared and towed the boat by a rope attached to its horn, until at last, on the waters subsiding, the ark grounded on the mountain-top.

Matsya, the fish avatar of Vishnu and also the first avatar of the god, came about in this way. The four-headed Brahma at the beginning gave forth a Veda from each of his four mouths. The four brothers, Mathukaitapas, the rakshasas (demons) stole them, and in order to avoid capture left the land and took to the sea, thinking to be safer there. They did not escape, for Vishnu, assuming the shape of a fish, pursued them. When the brothers perceived this, they changed themselves into little children and swam to the god for protection. Vishnu, however, when they reached him, hugged them all so close to his breast that he slew them, and so recovered the priceless Vedas.

This event took place at the time of the great flood. One account states that the fish which befriended Manu and saved the ark, with its occupants, was Matsya.

AMPHIBIA.—Frogs are not favourites in India. The common "Chunam Frog" (*Rhacophorus*) is detested and feared by women, because, if one leaps upon an expectant mother, the child born will be sickly and lean as the frog itself. Should a woman be touched by the animal, all evil consequences may be averted by catching a "Chunam Frog," killing it, frying it in oil, and then giving the baby a few drops of the liquid to drink. *Rhacophorus* is also held responsible for destroying the coconut in the nut. In order to bring this destruction about, the Frog climbs the palm and merely smells the fruit. When chased or handled, this Frog has the nasty habit of expelling the contents of the bladder, and it is commonly believed that if the fluid touches the skin it will cause a wound which will be painful and slow to heal.

REPTILIA.—This class contains the Crocodiles, Lizards, Snakes, and Turtles, all of which are found in India. The

Crocodile is the vehicle of Varuna, the Jupiter Pluvius of Indian mythology, who presides over the waters. It figures in the following story : Uhu, a demigod, was one day diving in a tank (pond) where a " rishi " (sage), Devala by name, was worshipping the water. Uhu in sport pulled the rishi's legs, for he was standing in the water while worshipping. The sage at first thought that it was a Crocodile that had got hold of him, but, on finding it was only a demigod that had played him the trick, he cursed Uhu, and made him become a Crocodile in real earnest. King Indraduma, the story continues, was an ardent worshipper of Vishnu, and one day, when performing his devotions, he was interrupted by the rishi Agastya, who came and asked the favour of an interview. The king continued his worship, and paid no attention to the request, whereupon the sage, highly offended, remarked : " I see you are as proud as an Elephant. You shall be one henceforth." Thus it came about that both Crocodile and Elephant found themselves in the same pool. Indraduma, as the Elephant, continued still to be devoted to Vishnu, and daily used to enter the water, pick a lotus, and lay it as an offering before the god in the temple near by. Once, when the Elephant entered the tank, it was immediately seized by the Crocodile (Uhu), and a very protracted fight, lasting for a thousand years. ensued. Eventually the god himself came and delivered his devotee, the Elephant.

Such is the tale so well known throughout India as the Gajenda moksha (the deliverance of the Lord of Elephants).

Among Lizards the Gecko is of great importance. The day of the week and the direction from which one hear its voice, also the part of one's body upon which it may fall, are concerned. The Gecko is one of the commonest animals in South India. It is the only reptile with a voice which is easily heard. Since Geckos are so very common inside houses, one can scarcely pass a day without hearing them calling, while frequently they fall from ceiling, wall, or pillar.

The following tables are translated from the Hindu Almanack (Panchangam), and explain—(1) what the Gecko's notes forbode ; (2) the fortune resulting from the creature touching the body. It is worth noting that in the first table the Hindu recognises ten directions from which the sound may come.

TABLE 1.—OMENS FROM VOICE OF GECKO.

Day.	E.	S.E.	S.	S.W.	W.	N.W.	N.	N.E.	From above.	From below.
Sunday .	Fear	Evil	Health	Meeting a relative	Fighting	New clothes	Money	Profit	Success	Realisation of all hopes
Monday .	Money	Dissension	Enmity	Quarrel	Entering the King's Court	Bad omens	New clothes	News of a marriage	Bad news	Riches
Tuesday .	Peace and plenty	Regain- ing a relative	Sorrow	Fear of an enemy	Success in the work on hand	News from distant lands	Fear of an enemy	Getting up a <i>vaganam</i> (cf. horse, elephant)	Travel to a foreign land	A very good income
Wednesday .	Happi- ness	Money	Bodily affliction	Loss of a relative	Fear	Loss of wealth	Health	Failure in the work on hand	Good news	Riches
Thursday .	Inaus- picious	Respect from relatives	Money	Realisa- tion of all hopes	Loss	Good words	Failure in the work on hand	Good food (wholesome food)	Dissen- sion	Dissen- sion.
Friday .	Good news	Good dress and jewels	Meeting a rela- tive	Good news	Joy	Dissension in the house	Dissension	Fear of an enemy	Recover- ing a lost thing	Bathing after pollu- tion from hearing death news
Saturday .	Very good news	Progeny and money	Meeting the King	Disease	New clothes	Desire gratified	Welcome news	Fear of thieves	Failure in the work on hand	Realisa- tion of all hopes

TABLE 2.—OMENS FROM FALL OF GECKO ON THE PERSON.

Part of body.	Result.	Part of body.	Result.
Head . . .	Dissension.	Navel . . .	Income of diamonds.
Face . . .	Meeting a relative.	Either side . . .	Good profit.
Eyebrow . . .	King's grace.	(sideways)	
Upper lip . . .	Expenditure (unnecessary).	Thigh . . .	Father's ruin.
Lower lip . . .	Money.	Knee . . .	Auspicious.
Nose . . .	Attack of some disease.	Ankle . . .	Auspicious.
Right ear . . .	Long life.	Foot . . .	Travel.
Left ear . . .	Profit in mer- chandise.	Woman's breast	Sinful deeds.
Eyes . . .	Imprisonment.	Buttocks . . .	Auspicious.
Chin . . .	Punishment from the King.	Nails . . .	Loss of wealth.
Mouth . . .	Fear.	Hair . . .	Fear of death.
Neck . . .	Enemy's ruin.	Top of the head	Death.
Right shoulder	Health.	Forehead . . .	Coronation.
Left shoulder . . .	Desires gratified.	Left arm . . .	Sorrow.
Right wrist . . .	Misery.	Right arm . . .	Mishap.
Left wrist . . .	Fame.	Back . . .	Loss of property.
Male organ . . .	Poverty.	Toes . . .	Fear.
Chest . . .	Money.	Left hand . . .	Sorrow.
Belly . . .	Income of grain.	fingers	
		Right hand . . .	Fear.
		fingers	
		Along the whole body	Long life.

Another Lizard common around bungalows is the small delicate-limbed one with a red tail in youth, known as *Lygosoma*. Its bite is said to cause instantaneous death, and it is avoided as the plague. For all that it is a very pretty and quite harmless little reptile.

Varanus, the largest Lizard in India, can usually be seen for sale in the market. It is killed and eaten, as its flesh is considered to strengthen the body. The Mahrattas are credited with having made use of this animal, which may reach five feet in length, in their raids. To enable them to scale the wall of a fort, the Lizard had a stout rope passed round it, and was made to climb up the wall, which it easily did by means of its sharp claws. Once the animal was over the top the men singly climbed quickly up the rope and entered the building.

Mabuia, another familiar Lizard, has a peculiarly aimless mode of progression. Consequently anyone who constantly changes his mind is said in Tamil to be of the "aranei" (name of *Mabuia*) type.

The well-known Blood-sucker (*Calotes*) has nowadays a yellow colour, but in the distant past it was of quite a sombre hue. A certain king (Marutha) was once performing a ceremony, and all the devas (gods) were present, chief among them being Indra (king of the devas), Yama (king of death), Varuna (lord of waters), and Kubera (god of wealth), when suddenly the demon Ravana appeared, whereupon each of these four gods at once assumed the form of his mount—Indra becoming a Peacock, Yama a Crow, Varuna a Swan, and Kubera *Calotes*. Ravana, noticing merely the animals, went away without recognising that they were the gods themselves. Up to this time all four animals had been black in colour, but when the demon retired each deva retransformed to his usual shape, and each gave his animal a boon. The Peacock got its beautiful plumage and the thousand eyes of the god now seen in its tail-feathers. It was also made immune to snake-bite. Yama promised the Crow that it should never die unless slain by man, that it should always be healthy, and that it should always, when eating, do so in company. For this last reason people call the Crows down to join in their meals, but it must not be forgotten that the souls of their fathers in heaven are satisfied when they see the Crows fed. The Swan was made white by Varuna, who said that from henceforth it would feel much more at home on water than on land. Kubera's favour to *Calotes* was to make it his own colour, that of yellow gold.

Snakes are so very common that they enter of necessity into the life and worship of the people. Probably the very earliest form of worship in India was simply that of the Snake. The Hindu recognises nine Snakes, all concerned in supporting the world. First of all and most important of these comes Adisesha with its thousand heads, upon which Vishnu reclines as it floats on the sea. This great Snake, according to one account, supports the world. Sometimes the globe rests heavily upon it, so that it shakes a little, and dwellers on the earth feel the tremors of earthquakes. Yet the Snake is patient and enduring in its task, and man should emulate its uncomplaining spirit. Man should be patient as Adisesha.

Long, long ago Adisesha quarrelled with the wind as to which was the stronger of the two. The great Hindu trinity—

Brahma, Vishnu, and Shiva—were the judges, and the contest agreed upon was after this fashion. Adisesha covered the thousand peaks of Mount Mahameru with his thousand hoods and wound his body round the base of the mountain. Then Vayu, the wind, came with all his might, and after several years succeeded in blowing off three of the peaks, which fell far in the sea hundreds of miles away, and Lanka was built upon them. Certain authorities consider that Mahameru was where the Altai Mountains now stand, and the three peaks landed where the present day Trincomalee now is.

Vasuki is the Snake used as the rope in the famous episode of the churning of the milk-ocean to form the nectar (*amritha*), the drinking of which made the *devas* immortal. Away far beyond the Himalayas stood Mount Mahameru, supported on a tortoise that was Vishnu. The Snake's body was coiled round the pillar-like form of the mountain. The *devas* held the tail, wisely leaving the venomous head to the *asuras* (demons). Then the gods at one end and the demons at the other moved the Snake just as the Hindu carpenter to-day works his drill. When the precious fluid was ready, the *devas* and the *asuras* seated themselves opposite each other on the ground to partake of this elixir of life; but one asura, Rahu by name, foreseeing that the *devas* alone would get the *amritha*, crossed over and sat with them between the sun and the moon. Vishnu now went to pour out the nectar, and in order that he might give to the gods only and not to the demons, he assumed the form of a most beautiful woman, Mohini (the temptress). He thus hoped to secure the undivided attention of the *asuras* directed to his beauty, so that he might pour out all the soma to the gods and leave none for the expectant demons. The ravishing form of Mohini secured the fixed attention of the *asuras*, and she had given the drink to Rahu and thus made him immortal, when the sun and moon pointed out to her the mistake she had made. Mad with anger at being deceived herself, she struck Rahu with her spoon and split him in two. Hence it comes to pass that we have the two Snakes Rahu and Ketu, which are now planets, which, on account of the old grudge they bear the sun and moon, at every eclipse devour these heavenly bodies.

Vasuki at first was the most poisonous of all the Snakes, but

he gave out his venom at the churning of the milk-ocean. This vast amount of deadly fluid would have poisoned every living thing had not Shiva himself come to the rescue and drunk it up. But even he did not escape scatheless, for the virulence of the draught was such as to turn his throat to a blue-black colour, whence arises one of his names, Nilakantha.

Four other Snakes are Ananda—who was an ardent worshipper of Vishnu, and whose name is a common one among Vaishnavites to-day—Kuliha, Padma, and Mahapadma.

Karkotaka is very venomous. He is one of the eight smaller Snakes that accompany Adisesha. He also enters into the story of Nala and bites him during his wanderings in the forest, and so delivers him from Kalki, the god of strife, who is to be the tenth and last avatar of Vishnu. Karkotaka is held to be very sacred, and is remembered by the orthodox Hindu on rising every morning.

There are nine Snakes employed in upholding our world. Adisesha is the largest, and directly supports the globe, while round him the eight others lie towards the points of the compass in the following order: Vasuki (E.), Ananda (S.E.), Takshaka (S.), Sankapalah (S.W.), Kuliha (W.), Padma (N.W.), Mahapadma (N.), and Karkotaka (N.E.).

Takshaka, the most poisonous of all, is the king of the Snake-folk who live in the under-world. He once stole the jewels that Uthanga was taking to his guru's wife. He it is also who narrowly escaped being burnt alive with all his kindred before Janemajaya, whose father, Parikshit, he had slain.

Kaliya was a Snake with a hundred heads, who dwelt in a tank and was so poisonous that not only the water in the pond, but the grass on its banks was envenomed, and even a bird flying over the fatal water fell dead from the poison-laden air and moisture. Krishna fought with him under the waters and destroyed all his heads save one, when he allowed the Snake to depart. Kaliya was afraid to go, for he knew that Krishna's bird (Garuda) would fight him at sight and kill him. Krishna then put his foot-print on the Snake, leaving a mark which Garuda would respect. The *namum* remains to this day on the inflated hood of the Cobra.

The Cobra is the best-known Snake in India and is widely worshipped. There are several common beliefs current about this Snake. The Cobras of the highest caste have a ruby (manickam) on the top of the head. When the Snake is wandering at night in search of food, it places this gem on the ground, and by its light it is able to see its prey. A very widespread idea firmly held is that the Cobra is only the female, while the Rat-Snake (*Zamenis*) is the male. If a man see the pair together and is noticed by them, then he must take to flight at once, for both Snakes will pursue him relentlessly, especially the Cobra. In such a predicament the best thing to do is to throw off some part of one's clothing, which the pursuing reptile will then seize and bite savagely. The fact that there are male and female Cobras, as well as Rat-Snakes of both sexes, present in thousands in India, will not make the Hindu give up his belief in this fantastic tale.

According to the Indian there are three animals in the world that love music—the Snake, to which the charmer always pipes; the Cow, to which Krishna, as the cow-herd, played his flute; and a baby. The middle finger in Tamil is known as the snake-finger, and no ring is ever worn upon it, because if this is done then a Snake is sure to bite the owner during the night. If a venomous Snake does not bite a human being then it gradually gets smaller and smaller. Finally, when very minute, it acquires wings and flies about in the darkness. Some people away in remote country districts claim the ability to see these peculiarly attenuated flying Serpents, and can point them out at night while they are on the wing.

We have previously referred to the fact that Snake worship is very common in South India, and is practised by all castes. In almost every village you will find snake-stones set up. These stones bear upon them very roughly carved representations of a single Cobra with inflated hood, or of a couple of Cobras entwined. When a married couple have no children—his religion demands that every Hindu must have a son to perform the necessary ceremonies after his death, so that his soul may have bliss in the hereafter—they think they have in some way offended Subrahmanyam, the snake-god. They therefore repair to the snake-stones of the village, and worship the god by

walking round them several times, or they may pay someone to make a snake-stone, which they then take to the temple and present to the god as a votive offering. We have seen a cart-load of discarded snake-stones lying about in the courtyard of Belur Temple. It is significant that Subrahmanyam is, perhaps, the commonest name in South India.

Still another way of appeasing the snake-god is to take some milk or ghee as an offering, and pour it down the holes in ant-hills in which Cobras are known to dwell. The Cobra is then expected to acknowledge the gift by coming up and licking it. On the same principle as the ancient Greeks called the terrible Furies the Eumenides, so the Tamil Hindus speak of the Cobra as the "good Snake" (nulla pambu).

In Travancore and Cochin every house has in its garden a snake-stone or group of snake-stones, round which worship takes place every week. In Madras city Friday is the day for snake-worship, but there is also one special day in the whole year, nagasowthi, the fourth day after the new moon in October. Shiva alone of the trinity of great gods wears Snakes as ornaments round his arms and neck. Brahma and Vishnu possess golden jewels, but Shiva, for various reasons, would not have gold. It is recorded that he considered all goldsmiths thieves, and would not trust them with his treasure.

As is well known, the Snake has two tongues, or more correctly, a single bifid tongue. How snakes got this peculiar organ forms a special tale in itself. In the golden age Prajapati had two fair daughters named Kadru and Vinata, the wives of Kashyapa, who, before retiring to the forest, gave each a boon. Kadru wished to have a thousand Snakes as her sons, all of equal splendour, while Vinata asked for but two sons, equal to all the sons of Kadru in strength, energy, size, and prowess. To his wives the husband said, "Be it so."

After a long time Kadru laid a thousand eggs, and Vinata a pair only. Five hundred years later the sons of Kadru hatched out, but Vinata's two eggs produced nothing, whereupon Vinata, feeling ashamed, impatiently broke open one of them, and saw her offspring as an embryo, with only the upper part of the body developed. On seeing his mother, the child cursed her, saying, "Mother, as you have prematurely opened this egg and did not

allow my body to be fully developed, being jealous of Kadru, you will yet be the slave of this same Kadru. But, O mother, if you are desirous of having your other son strong, take tender care of the egg for five thousand years." After upbraiding his mother thus, the child, Aruna by name, rose to the skies and became the charioteer of the sun, for he had strong arms. He may still be seen in the sky of the early morn urging his steeds forward.

At long length the second egg hatched out, and produced Garuda, the snake-eater. About this time the two sisters saw one day approaching them the gem of all horses—Uchairsrava—who arose from the milk-ocean at the churning of the amritha. "Tell me, sister," said Kadru, "without delay, what is the colour of this horse?" Vinata replied: "This king of the horses is white in colour. What colour do you think he is? Let us lay a wager on it." "I think his tail is black," answered Kadru, "but let the loser of the wager become the other's slave." When the horse came nearer, lo! its tail was black, and Vinata became subject to Kadru.

Many years after the losing of the wager, Garuda was repeatedly ordered by the Snakes to take them to some islands with an abundance of pure water. After reflecting for some time the noble bird asked his mother why he should always have to do the bidding of these Snakes. Then did Vinata sorrowfully tell him of the lost wager and how she had not won, being deceived by the sons of Kadru, who, at their mother's command, became dark hairs in Uchairsrava's white tail, thus concealing the true colour. After she had ended, Garuda, in great grief, said to the Snakes: "Tell me, by bringing what thing or gaining what knowledge or doing what great work, we may be freed from this state of slavery." Then answered all the Snakes: "Bring us the amritha by force. Then, O bird, will you be free indeed."

After several attempts Garuda obtained the nectar, but, when returning, he met Indra, who was uneasy lest anyone should drink of it, and by so doing become, like the gods, immortal. Garuda promised him that he would allow no one to drink of the soma, and stated that he had good reasons for requiring the fluid. "O deity of the thousand eyes," said he, "after I lay

the soma down you can instantly take it up and bear it away." "Then, oviparous one," replied Indra, well pleased, "accept from me any boon you wish." Thus addressed Garuda, recollecting the sons of Kadru, and the enslaving of his mother by their deception, prayed "O Indra, let the mighty Snakes be my food." And so it is to this day, for almost at any hour you can see Garuda (the Brahminy Kite) swoop to earth and again rise, bearing aloft a writhing Snake in its talons. Thus is the enmity between the two eternal.

Garuda flew to his mother with the good news, and gladly addressed the Snakes: "Here have I brought the nectar, and I shall place it on the sacred grass (kusa). After performing your ablutions and religious rites, drink ye it, but first of all, as ye promised, let my mother become free from this time henceforth." "Be it so," answered the Snakes, as they departed. Meanwhile, Indra, seizing the amritha, returned with it to heaven. The Snakes soon came crowding together in great joy to drink the soma, but found only the grass upon which it had been placed, and in licking this the stout stems of kusa split their tongues in twain.

Among living snakes the Tree-Snake (*Dendrophis pictus*), though harmless, is believed to be very poisonous. After biting a person it climbs the nearest palm, and on the top waits till it sees the smoke arising from the funeral pyre of its victim. Only after being so completely satisfied will it descend to the ground once more. This belief is so engrained in the native mind that the Tamils, whenever this Snake bites a man, actually make a mock funeral pyre by setting light to some straw, so that the Snake from its lofty position may see the smoke arising. The Snake, thus deceived, is said then to descend at once, and as it climbs down the palm the pain is believed to lessen in the body of the sufferer and the poison gradually to depart.

Another green Tree-Snake (*Dryophis mycterizans*) is also harmless, but has the peculiar habit of striking at a person's eyes. It is very important, because of a curious belief that any woman who is a bad cook, by touching it, will cook well ever after. A student bringing a dead one to college counted twenty women who came forward and touched it as he passed, in order that their cooking in future might be an assured success.

The Double-headed Snake (*Eryx johnii*) is harmless and often used by snake-charmers. The tail end is short and very blunt. Every six months the head is believed to change places with the tail.

Chelonians are represented in South India, but concerning them there is only one tale which refers to the second avatar of Vishnu, called Kurma, the Turtle. According to one version of the story, Vishnu took this form in order to recover the treasures lost in the universal flood, when, from the waters, among other things, the following animals were obtained: Uchaisrava, Khamadhenu (Cow of plenty), Kavat aira (three-trunked Elephant of Indra), and the Chank, which conferred victory upon whosoever blew it. Another account relates that when the churning of the milk-ocean took place, Mahameru began to slip down owing to the violent movements of the Snake Adisesha. In order to support the mountain, Vishnu came to the rescue, and by assuming the form of the Turtle and going beneath the mountain, he was able to bear it on his broad back. A variant of this tale is that the earth rests on eight Elephants, which all stand on the carapace of a huge Turtle.

This episode of the churning of the milk-ocean is such an important one that we may note the real meaning of the events which then took place. It has been said that the sea of milk is the ocean of existence. Mahameru is the world itself, the gods are good impulses and the demons bad ones, while the twisted Snake stands for time. Constant interaction of good and bad impulses in the world throughout the ages results in the formation of nectar, which is all the ideas of religion, civilisation, culture, art, and everything upon which humanity has been developed and has lived.

(To be continued.)

ORNITHOLOGICAL REPORT FOR NORFOLK (1915).

By J. H. GURNEY, F.Z.S.

(Concluded from p. 209.)

AUGUST.

6th.—A Gadwall + shot on Hoveton Broad (Blofeld).

21st.—N.W., 4. Common Buzzard + taken at Rollesby (E. C. Saunders), a very early occurrence.

25th.—For several years Barn-Owls have nested in a large elm near my house, obtaining access through a broken limb to its hollow trunk. Here a descent of some 14 ft. is necessary to the nesting platform, and as the diameter of the hole is less than 3 ft., the mystery is how they get out of it. The young birds might clamber their way up, but it must be more difficult for the longer wings of the old ones. It is in fact on a large scale what a Woodpecker's hole would be, but then Owls have not got the Woodpecker's climbing feet.

The appearance of a White Owl in the day-time is sufficiently unusual to puzzle the small birds, but they realise that it is a mouse-hunter, and are not excited by it in the way that they would be by a Tawny Owl.

If a Barn-Owl comes abroad voluntarily, with the intention of mouse-hunting before twilight has set in, it is to be noticed that its flight is low.

SEPTEMBER.

2nd.—N., 3 in the morning. N.E., 5 in the evening. As early as 4.30 a.m. a Greenshank, which had lost its bearings in the high wind, was seen by Mrs. Wathen on a lawn near Aylsham, quietly consorting with some Ducks by a pond. It was a wild night, which accounted for many Waders on the flats of Breydon, where the plaintive notes of the Grey Plovers were incessant (A. Patterson, see 'Zool.,' p. 374).

3rd.—N., 4 in the morning. N.E., 7 in the evening. The migration of Waders was not confined to Breydon Broad, for at a point about eleven miles further north and some four miles

from the coast Mr. Vincent watched a big migration heading north-east against the wind. This movement consisted chiefly of Dunlins, but also included, as near as could be guessed, some forty Reeves, fifteen Ruffs, seven Greenshanks, and five Bar-tailed Godwits.

6th.—From its partiality to tall trees, Beech especially, the presence of the Lesser Spotted Woodpecker would never be suspected but for its resonant hammering, the vibrations of which in early spring are quite as loud as the sounds produced by the Greater Spotted Woodpecker. To-day I had the good fortune to find one exploring a hole only 8 ft. from the ground, and, coming up gently, had a good view. The bird was apparently searching for insects inside the hole, which was an old Green Woodpecker's domicile.

Mr. Tracy, who has lately been making observations on the Lesser Spotted Woodpecker in Hampshire, has noticed that when making its tapping noise it keeps the beak wide open.

27th.—N.N.W., 3, to N., 5. At an early hour—7 a.m., wind north-west, with a falling glass—there was a considerable passing of Chaffinches at Northrepps, mingled with a few other small birds, all of them moving west and flying low. At the same time a sprinkling of Starlings, Wood-Pigeons, and Pied Wagtails were flying about indifferently. Although the Chaffinches were on migration, these three latter species were not so for the moment. In the course of the day the wind got up to point 5, and two flocks of Golden Plover appeared.

As a proof of how the wind varies, the following readings taken in Northrepps to-day at one and a half miles from the sea may be cited :

7 a.m.,	N.N.W.,	Force	3.
9	„	„	3.
11	„	N.	4.
3 p.m.,	N.N.E.,	„	3.
5	„	N.	5.
8	„	„	4.
10	„	N.	3.

In the Broad district the wind was reported high by Mr. Vincent, who saw two Buzzards on passage, and at Yarmouth it was high also (N., 4 in the evening), This was the beginning of

the migration of Rough-legged Buzzards, which has been already reported in these pages ('Zool.,' p. 37).

28th.—N.W., 2. A considerable sea on at Overstrand. As is always the case after a high wind in autumn, Herring Gulls and Lesser Black-backed Gulls were to be seen passing continuously in little flocks, and, as usual, going north-west. If the wind changes to the east, the movement stops. With them was one Richardson's Skua †, and I observed the remains of another, which had met with some fatality, on the shore. A flock of forty Lapwings were also going north-west.

30th.—N.W., 3. [A Pelican reported on Breydon Broad (Patterson). It was seen by a gunner named Wigg, and was probably an escaped bird.]

OCTOBER.

1st.—N.N.W., 4. A solitary Snipe flushed by the Hickling keeper, and a Snow-Bunting seen on the hills by Mr. Barclay. Another Snow-Bunting was seen by Dr. Ticehurst actually in the main streets of Lowestoft. About fifty Martins † going north.

6th.—Common Buzzard † taken near Yarmouth (E. Gunn).

11th.—E.S.E., 5 at Spurn Head. Great flight of Robins in North Lincolnshire (G. Caton-Haigh).

12th.—A Yellow-browed Warbler shot in Suffolk (C. B. Ticehurst), for which the high wind yesterday morning (S.S.E., 5) may have been responsible. A much earlier occurrence was noted in Lincolnshire on September 18th by Mr. Caton Haigh.

13th.—Mr. F. N. Chasen reports an immature Gannet on the shore at Caister, and a Fulmar Petrel, which had been dead some time.

20th.—It was remarked to-day of a Red-throated Diver † picked up on the shore at Overstrand, that the skin round the eye in this species has a power of contraction, which is no doubt used when the bird submerges itself.

21st.—The horribly adhesive machine-oil which has been thrown out by our submarines has been very destructive to the diving sea-birds. To-day Mr. B. Dye picked up a Cormorant on Yarmouth south-beach stained brown, or rather black, by this mixture, which clogs everything that comes in contact with it. Mr. Patterson reports several washed-up victims, viz. a Rook,

Hooded Crow, Red-throated Diver, Little Grebe, Puffin, Guillemot, Razorbill, and Black-backed Gull. In a field a few miles inland Mr. R. Gurney saw a Black-headed Gull much stained, but still able to fly. Two Razorbills † which were given to me were saturated, as were I believe two Little Auks which fell victims at Blakeney (H. Pashley).

NOVEMBER.

6th.—E., 2. A couple of Ruddy Shelducks passed Mr. J. Vincent when at no great distance from the coast, flying due east. His attention was first attracted by the noise they were making, but as he watched them they kept rising higher and higher until lost to sight.

A Ruddy Shelduck, in all probability one of this pair, was shot on the 8th somewhere between Ludham and Yarmouth (E. T. Roberts), and another in the same neighbourhood on the 16th (E. C. Saunders).

10th.—Mr. Saunders received from Potter-Heigham a Black-breasted Dipper, † not showing any tinge of chestnut, and a Rough-legged Buzzard from Filby; and another about this time was shot at Snettisham.

Mr. Bird reports a Grey Shrike on Crostwick Common, where it had spiked a Sparrow.

12th.—A Little Auk † picked up at Northrepps under somewhat curious circumstances. A woman, whose chimney is used as the support of a telephone, heard the wire vibrate at about 4 p.m., and on going into her back yard some time afterwards, found there a Little Auk, which appeared, from a mark on its neck, to have struck the wire. This is not far from where one flew in at the open wicket of a stable a few years ago and was found by my gardener in a loose box. Is it possible that the Auks mistake the buildings for rocks in such cases?

15th.—A Little Auk † in a ditch near Keswick (H. Halls). My coachman succeeded in keeping it alive for a week. When swimming, if looked at from above, the white spot on the upper eyelid, which at other times is hidden, showed conspicuously, if the bird was excited. In illustrations this spot is generally shown when the bird is at rest, which is incorrect. In addition to these, I heard from Mr. Bird of one at Neatishead, besides which no

less than twelve were offered to Mr. Pashley, four to Mr. Gunn, two to Mr. Roberts, and two to Mr. Clarke. At Blakenney, where Little Auks have ceased to be a rarity, Mr. Pinchen saw three pass along the shore, and another struck a wrecked ship and killed itself. Previous visitations of the Little Auk to Norfolk and Suffolk were in October, 1841; December, 1846; November, 1861; November, 1878; January, 1895; and November, 1910.

19th.—A Black-throated Diver received from Barton by Mr. Gunn, and on the 26th another.

Passage of Swans.—Although we had no great severity of weather during November, flocks of Wild Swans made their appearance.

At Blakenney some were seen by Mr. R. Pinchen winging their way westwards, and at the same time considerable herds appeared on, or rather flying over, our largest Broad. This was particularly noticed by Mr. Vincent, who is in charge there, on November 13th—a rough day—when we had a high wind from the north-north-west, which at 8 a.m. registered force 6, but in two hours' time dropped to 4. Mr. Vincent has furnished the following notes:

5th.—An immature Whooper Swan.

12th.—Very low glass, with heavy rain in the afternoon. Eleven Bewick's Swans seen going west.

13th.—N.N.W., 6. Sleet. Flocks of 17, 13, 9, 7, 4 Swans, all believed by my informant to have been Whoopers, passed. He remarked that they were struggling against the strong north-west wind, and flying due west.

14th.—A flock of six and another of four Bewick's Swans, also going west against the wind, which had moderated to force 2.

15th.—Flocks of four and five Bewick's Swans going west.

16th.—Only one Bewick's Swan.

20th.—Three Bewick's Swans, one of them immature.

22nd.—Seven Bewick's (?) Swans going west.

28th.—Eight Bewick's (?) Swans.

The remarkable thing about this passage of Swans is that the 13th is almost the very day on which six great flocks came last year, all believed to be Bewick's Swans ('Zool.' 1915, p. 142). Whatever they were, they were going in the same

direction, viz. west, which would take them straight inland if persevered in. Neither in 1914 nor in 1915 did any of these Swans, as far as we know, alight on Norfolk Broads.

27th.—Twenty-three Woodcocks bagged in the large wood at Felbrigge, after a north-easterly gale which reached point 5 at Yarmouth and Spurn Head yesterday evening, with snow, as I learn from Mr. Kerr.

DECEMBER.

9th.—Garganey Teal, † immature male, shot at Martham (E. C. Saunders). In the 'Zoologist' for 1900 it is remarked (p. 103) that the Garganey is never seen in winter, but the above occurrence proves that there are occasional exceptions to this rule.

17th.—A Little Auk at Downham Market (R. S. Smith). A few black feathers among the scapulars of a Grey Crow † displayed as a scare-crow at Hempstead were very suggestive of hybridism, which is probably less rare among Crows than is generally supposed. At the same place a skein of forty Pink-footed Geese † was seen.

VARIETIES.

January 18th.—A pale variety of the Teal, a female, sent to Mr. E. C. Saunders, from Cantley.

January 30th.—A fawn-coloured Blackbird † at Mr. Roberts'. Another † at the same time at Keswick, with a patch of white. This bird remained all the winter, but disappeared in March, only to return to the same shrubbery the following December, where it remained for four months.

August 31st.—A white Martin under the eaves of the Swan Hotel, Horning, and another in a nest at Hill-crest House, Cromer (H. Cole). Also a pale Sand-Martin at Hickling, and a silver-grey Swallow at Stokesby (Saunders).

October 18th.—A variety of the Moorhen, † with silver-grey under-parts, the feathers being of a hair-like consistency, and a mantle which might be described when fresh as golden-brown, was shot at Rollesby (Saunders). In a normal Moorhen the interstices between the barbs of the feathers are filled up

with barbules, which stand in the same relation to the barbs as the barbs do to the feather's stem. In the present specimen many of the barbules are wanting, which affects the texture of the whole plumage.

October 30th.—A white Moorhen, † in fact an albino with pink eyes and legs, taken in East Norfolk, was received by Mr. E. T. Roberts, a variety quite as uncommon as the one last mentioned.

The daggers (†) indicate that the specimens have been inspected by the recorder.

A DIARY OF ORNITHOLOGICAL OBSERVATION MADE IN ICELAND DURING JUNE AND JULY.

BY EDMUND SELOUS.

(Continued from p. 152.)

SIGURDSSON tells me that he has, to-day, for the first time, seen a Phalarope dive. He was quite near to it, he says, and could not have been mistaken. This supports my own conclusion founded on my, all at once, not seeing this or that bird that had been on the water just before, though I never did actually see it either disappear or reappear.

The island I am on illustrates very well the steps by which this species may have taken to the water in a gradually increasing degree, being, at first, only a wading bird. For here are places adapted for wading, in close juxtaposition with what are still its breeding-haunts, and were, no doubt, once the scene of its general activities. From them an increasing number of individuals advanced more and more, and farther and farther into the water, till they took to paddling, and, becoming thus water birds proper, lived in it, without respect to the character of the adjacent land, so that they now have often to fly some little way, to get to the old, still-desired breeding-places.

One may often see one of these Red-necked Phalaropes floating, apparently, backwards, down a strong or even violent stream. When looked at with more attention, however, it seems to be endeavouring, quite futilely, to swim against it, but not at all uneasy at not being able to. This is on the broad, rapid torrential river that issues from the great lake, where I crossed it. In miniature, however, I have seen the little bird prettily caught, in baby rapids, above a baby waterfall of a tiny stream, turned round in the rapids and floated backwards over the waterfall. But whether it was a real, involuntary turning round, or that thus going backwards, even though with some show of

paddling, in the usual way, has become habitual to the bird, I cannot feel sure about.

After having made the above observations on the Phalaropes, I went to the nest that a pair of Great Northern Divers have, as before mentioned, built, or rather laid down, on the shore of this island. It was a depression which at first seemed to have been formed by the pressure of the bird's body, merely, amidst the grassy herbage of the bank, but investigation showed that some of this had been detached, which implied construction, though of a rude kind. The situation of this nest at once struck me, for here was no shelving shore, as a means of approach to it, but, on the contrary, a perpendicular bank, at least six inches in height, but, I should think, an inch or two more than that. To surmount it, the birds must have made a tremendous leap out of the water, which tallies with what I saw in the case of the pair I watched, though here, so far as I can remember, both the height and the steepness are greater. One cold and bad-looking egg lay in the nest, which, Sigurdsson said, the parents would have paid no further attention to, after the advent of the first chick to hatch out, with which they would have gone off, almost immediately on that event taking place. He told me that, according to report, this is the common practice of these Divers, however near the unhatched chick may be to leaving the egg, even though it should be chipping the shell. This would seem a strange unnatural habit, but I am inclined to think that the abandoned egg represents that one which, with so many birds, never does hatch, but is addled (as I suppose) from the beginning.* If such be the case, it is perhaps possible that the birds, by their own sensations, may detect the want of life in the egg, or know, from previous experience—which, however, must first have been gained—that there is never more than one chick hatched. Yet even if the desertion could be thus explained, there would still be the bad egg to account for, so that it seems more probable that the whole matter is under the guidance of some larger and more impersonal law. That, to procure one chick, two eggs should annually be laid, is certainly a waste of energy, and it is therefore interesting, as suggesting that natural selection is in process of getting rid of this waste, that out of the two nests of

* In this supposition I was correct. See *post*.

this species which have come under my observation, here in Iceland, one contained a single egg* only, which had been sat upon for some time. It seems probable, therefore, that, in course of time, one egg only will be laid by the Great Northern Diver, as one might expect of a bird which has only one chick. And it is curious that the Red-throated Diver also seems travelling in this direction, for though it lays two or more eggs, which normally represent as many chicks, yet of these two (three is rare, but I have seen it) one very commonly dies, sufficiently so, in fact, for an authorised "watcher" of this species to have expressed the fact by saying, generally, that the chicks "dwindled." And this word, which was used in reference to the actual dying, as well as consequent diminution of the family, is applicable also to the process of it, the chick that is fated not to survive, being born, apparently, with a want of vitality which shows itself, from the very first, in a disposition to sit on the bank, for a longer and longer time before coming into the water (where alone it is fed) and to return to it, again, in a shorter and shorter time, till, at last, it is found lying dead there. Thus these two species show a chain of progression from a larger, yet small, family, to the smallest possible, the earlier links of which, only, have been passed through by the one, whilst the other has reached the last of them, which, however, has not yet become fixed. The links, as I have seen them, but with two probable intermediate ones† added, are (1) three eggs and three chicks, (2) three eggs and two chicks only, owing to the early death of one out of the three, (3) three eggs and two chicks only, owing to one egg not hatching, (4) two eggs and two chicks, (5) two eggs and one chick only, owing to the early death of the other one, (6) two eggs and one chick only, owing to one of the two eggs not hatching, (7) the family of one only, egg and chick. Some may think, perhaps, that this is counting the links of the chain from the wrong end, and that the Diver family has increased instead of diminishing; but I cannot suppose that any egg or any chick would be, at first, and as the usual thing, infertile or unable to

* I ascertained that this was so from the beginning.

† (2) and (3) namely. Of course one cannot tell how many eggs were normally laid when the process which I have suggested, and to some extent observed, commenced

live. These are not stages in an upward road. I feel sure that the process has been the other way, and think, moreover, that I can see a reason for it. During the spring of 1913 I watched, continuously and from day to day, the domestic economy of a pair of Red-throated Divers.* One of the two chicks died in the way I have described, but, even after this, the surviving one, that had now two parents to attend to it, was fed by them at very long intervals. One must suppose that it got enough, but, with anything like a struggle, two would be less likely to, so that, as one robust chick is better than two weakly ones, it would be for the benefit of the species to have this change brought about. This would be all the more the case because, as here implied, it is the habit of the parents, when there are two chicks, each to take charge of one of them, and, as they then separate, this would prevent either chick from benefiting at the expense of the other and less hardy one, which would be the same principle, but less effectively applied. It is indeed possible that the one chick, in the instance observed by me, died because the sole parent in whose charge it was did not sufficiently nourish it, but it did not appear to me to be more neglectful in this respect than was the other. On the other hand, the lesser activity of the chick that succumbed—its more lethargic ways†—was noticeable from the beginning, and seemed to be the governing factor. I cannot myself think of a quite satisfactory explanation why the chicks of these Divers should be fed at such long intervals, but the grown birds have themselves to cater for, as well as their young, and the impartial law of natural selection will not more have favoured the efforts of the bird to catch fish than of the fish to avoid being caught. It may be a hard struggle, and should the food supply ever run short, a single year might see the death, through starvation, of a large number of chicks. Obviously, therefore, one chick that was tended by both its parents would have double the chance of surviving that either of the two tended by one of them only would have, whilst, at the same time, the burden upon each of the parents would be only half as great. I do not know whether, owing to long habit, become stereotyped, the young of the Red-throated Diver are fed on one kind of fish

* See *résumé* of my notes in 'Wild Life' for 1914.

† See *ante*, p. 268.

only, but I have never myself seen anything but sand-eels brought in to them. In no instance were they fed with fish from the loch on which they were established, but only from the sea.

If we suppose that natural selection has, in some cases, lessened the number of young birds in a family, by favouring those couples (and, through them, the race) to whom a sickly child was born (so long, of course, as it died), then, on the principle, "*Bis dat qui cito dat*," we can understand this sickliness showing itself at an earlier and earlier age, till, at last, the dissolution took place within the egg. Here, then, may be the explanation of a fact that is not the less one because reference is so seldom made to it, viz. that one egg of a sitting is often addled. I believe this to be normal with the Dabchick, as probably also with the Curlew.* With their brood of four—which I think is the ordinary one—well advanced, there was an unhatched egg in the nest of the Merlins that I have been watching, whilst, from what I can learn, Sea-Eagles here have usually but a single eaglet. I have made the same observation with various other species of birds.

Birds may derive their fecundity—which originally, perhaps, was greater and more general—from their reptilian ancestry, but when both the eggs and the hatched young require little or no attention, as is, speaking generally, the case with reptiles, large families are not an incumbrance. With the advent, or increase, of personal concern for the offspring, however, this is no longer the case. The burden now begins to make itself felt, and may for various reasons, become detrimental. The gradual lessening of it, therefore, where this is the case, through the action of natural selection, would not be at all surprising. Such a result might be brought about in a variety of ways, including the destruction of the egg by the parent bird itself—a thing which I have, in one case seen, and, in others, had to infer.

It would seem that whilst some of the Phalaropes are sitting, others have either yet to lay, or have not laid all their eggs. The last might account equally for the attentions still paid by the males to the females and the refusal of them by the latter. The brusquerie of the courtship would also be in accordance with the later stage of things, as may be seen in all birds, I think, and notably in the male Pheasant, who, in the earlier

* Dr. Heatherley has noticed this.

part of the love-season, courts the hen with a most elaborate display, whereas, later on, he makes hardly more ceremony with her (nor she with him) than does the Domestic Cock in the barn-yard—"Sic transit gloria amoris." A later stage still, is masculine languidity, under the influence of which the female is apt to become the wooer, as I have particularly noted with Gulls. For the male Red-necked Phalarope, however, though I have seen all too little of his courting habits, yet this afternoon's observations have given me an insight into his real character, and it seems to me that, in this demure, plain-looking little husband, we have one of the "freckest" lads in all bird-land. Who was it thought he was hen-pecked?—or was that his poor brother, the Grey Phalarope, who, however, may perhaps have revelations of his own to make?

(To be continued.)

NOTES AND QUERIES.

AVES.

Bird Notes from Bury St. Edmunds.—The Tawny Owls returned to our church-tower this spring for the tenth successive year, but the nest was spoiled in a gale at the end of March. Some rubbish was blown into the nest, breaking one of the two eggs, and the birds deserted. But the pair which always breed in our own grounds were more successful. Four eggs were laid in a nest-box, all of which were hatched. One Owlet died in the nest when nearly full-grown, but the others got away safely, and we hear them every night. The hen-bird was very tame when sitting, and would allow us to put a ladder up and look at her without moving. All mice caught in the house were her perquisites, and on one of my visits I dropped three mice in succession into her box, but she took no notice. In the way of food I found in the box a very good specimen of *Mus flavicollis* and the remains of a Missel-Thrush. A Stock-Dove laid two eggs in the same place in the church-tower which the Owl had occupied, but forsook them. In our nest-boxes we have had the Great Tit, Blue-Tit, Coal-Tit, Tree-Sparrow, and Starling. I have not done much nest-hunting this year, but have found three Cuckoos' eggs, which were certainly laid by three different birds. Two were in Hedge-Sparrows' nests, one of which was exactly like a typical egg of the Whitethroat, and the third in a Reed-Warbler's nest. This was one of the reddish-brown "zoned" type, which one could almost match with some eggs of the Tree-Pipit. My own belief (for what it is worth) is that the "assimilation" of the Cuckoo's egg to that of the foster-parents is entirely accidental, and that there are many "Cuckoo clutches" in collections to which the egg of the Cuckoo does not really belong. Quite by accident one day I produced a most accurate imitation of the "water-bubbling" cry of the hen Cuckoo, when filling an ordinary medicine-bottle from a pail of water. The resemblance was most striking, but repeated efforts failed to get quite such a good effect again. Cuckoos have been more abundant this year than we ever remember; Swallows and Martins perhaps rather above the average, but most of the other summer migrants rather below it. For the first time in my life this year I have seen a Black-bird's nest with six large young ones, and of seven clutches of Yellow Bunting I have found two were "fives," which in our district

is very rare. A few weeks ago I had the pleasure of showing a young friend a Lesser Spotted Woodpecker in the very act of "jarring," and he was able to get a good view of the bird through my field-glasses. The remarks of the late Professor Newton on this subject ('Yarrell,' ed. IV, vol. ii, pp. 477, 478) are well worth reading, and his most captious critic could hardly question their accuracy. Certainly the noise is very loud for so small a bird, and one day, when my daughter was riding past the old beech frequented by the Woodpecker, it quite startled her horse.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Yellow-skinned Variety of Jackdaw.—On June 22nd a friend of mine shot and sent me a curious variety of the Jackdaw. On taking off the skin ready for mounting it, I found this was of a deep yellow colour from the base of the beak to the root of the tail; both inside and out were yellow, similar to the colour of the skin of some domestic fowls when plucked ready for the oven. The beak is a fine yellow from point to base, making the bird look like a fine old cock Blackbird; the legs and feet are also pied black and yellow, similar to the legs and feet of the Pomatorhine Skua. The eyelids are also edged with yellow. The centre of the crown of the head is black, but all round the black is a fine broad margin of pure white, including the feathers that cover the nostrils; this white extends to the bottom side of the eyelids. There is one grey feather on each side of the wings and two or three on the rump. I have six other varieties of the Jackdaw, but this one is very different from the others. The bird under notice was killed close to Mansfield.—WILLIAM DAWS (Mansfield, Notts.).

Habits of the Cuckoo.—On May 29th last I found a nest of the Tree-Pipit containing three eggs, also two eggs of the Cuckoo: the Tree-Pipit's eggs were slightly incubated, whilst the Cuckoo's eggs were fresh; this proves that the Cuckoo's eggs were deposited after the Tree-Pipit had commenced incubation. I once found a nest of the Chaffinch in ivy on a wall, about 8 ft. from the ground, containing only a Cuckoo's egg; two days after, the egg was still alone in the nest, and I took it; one can, of course, surmise, as Mr. J. Steele Elliott points out ('Zool,' p. 232), that the Cuckoo located the nest when it contained eggs of the Chaffinch and that on returning with her egg she found the nest empty; one can also surmise that the Cuckoo deposited her egg in the empty nest without having seen eggs of the foster-parent. The following would be a possible, and at the same

time a probable solution of what happened : that the Cuckoo located the nest when it contained one egg, then, selecting the nest for her own egg, threw out the egg of the Chaffinch. The Chaffinches having discovered their first egg taken, forsook ; this is well known amongst us all, that birds having their first eggs taken, often, I will not say always, forsake ; then the Cuckoo, returning later with her egg, placed it in the empty nest. I found a Blackcap's nest a few years ago in a stone-quarry a little south-east of Wells, containing a Cuckoo's egg and four of the foster-parent, and underneath the nest, stuck in the brambles, was another egg of the Blackcap, which helps to prove that the Cuckoo often ejects one egg of the dupe, especially if there are five ; but I have often found a Cuckoo's egg, with five others, in the nest.—STANLEY LEWIS (Wells, Somerset).

A Pair of Buzzards with two Nests.—Early last May I came across an instance of a pair of Buzzards building, or at least occupying, two nests before laying. Both nests were situated amidst beautiful scenery in a glen-side wood, in oak trees ; one nest was a perfectly new one, the other was an old one remodelled. Both were edged around with fresh green ivy sprays. The eggs were laid in the new nest, which, as far as I know, now contains young ones, as the female was sitting closely, so I was informed, on May 26th.—STANLEY LEWIS.

Greenfinches occupying Blackbird's old Nest.—On June 10th last I found a Greenfinch's nest with five eggs built in the cup of an old Blackbird's nest in ivy, at Croscombe, near Wells ; the nest was well down below the level of the Blackbird's and could not be easily seen. The nesting-site is very unusual and the eggs also are unusual, being a nice cream-coloured set with a few very faint spots on the larger end.—STANLEY LEWIS.

Cuckoo's Egg in Unfinished Nest of Goldcrest.—With further reference to the habit of the Cuckoo dealt with by Mr. J. Steele Elliott in the 'Zoologist' (June), the following incident might be worth recording. On June 10th this year I found a Cuckoo's egg in the nest of a Goldcrest, built in the usual situation at the end of one of the lower sprays of a big Douglas fir. There was only this one egg, and the fact that the nest was unfinished proves conclusively that in this case at least the Cuckoo inserted her egg in a nest that had not yet held its rightful eggs. The nest was, in fact, one of the unlined structures that are not infrequently to be found in the vicinity

of tenanted Goldcrest's nests, and which, by reason of their somewhat looser, untidy construction and unfinished condition, I take to be the equivalent of the "cock's nest" of the common Wren. The moss, etc., of the nest was so loosely cohering that the heavy egg of the Cuckoo was deeply embedded, although it proved to be quite freshly laid. Owing to the position of the nest, the insertion of the egg must have been a matter of some little trouble. Further, the tree was situated in the interior of a stand of mixed larch and fir within a large oak-wood. Both these facts suggest discrimination on the part of the Cuckoo, however much at fault the choice may have been. —EDWIN L. WOOD (Harrow).

Notes on the Laying of the Cuckoo.—Mr. J. Steele Elliott (*ante*, p. 232), referring to my note in the 'Zoologist,' p. 153, 1916, relative to the Cuckoo sometimes laying its eggs in empty nests, implies, and quite rightly, that such nests may have had the egg or eggs of their rightful owners taken, and therefore the above note does not affect the point of his query ('Zoologist,' p. 317, 1915). There can, I think, be no doubt that the Cuckoos do occasionally, and perhaps frequently, lay in empty nests which have never previously contained any egg or eggs of the owner of such nests. Speaking from personal observation, most of the Cuckoo eggs I have found have been laid in the nest of the dupe when about the third egg had been laid. The following instances, among others, may be cited as bearing on the nature of Mr. Elliott's inquiry. In the 'Countryside' for May 19th, 1906, Mr. Pearce records having found four nests of the Reed-Warbler, each of which contained a Cuckoo's egg. In one nest the egg of the Cuckoo had been placed before the nest was finished, but still the birds continued building, and when the first egg of the rightful owner was laid the lining of the nest almost covered the cuckoo's egg. Another correspondent of the same journal writes in the September number, 1906, that he has known of two instances in which the Cuckoo's egg was deposited several days before the nest of the dupe was complete; and in one instance the Cuckoo's egg was woven into the lining of a Hedge-Sparrow's nest, after which she deposited her eggs. One writer even goes so far as to say that the Cuckoo's eggs which he has found have in every case been deposited before the rightful occupant's eggs. Another correspondent in the 'Countryside' speaks of a nest of the Pied Wagtail having been but barely finished when a Cuckoo's egg was deposited, and it was two clear days before the first egg of the Wagtail was laid. I could quote a number of other cases in which the Cuckoo's egg had been laid in empty nests,

but whether previously the nests had been robbed it would perhaps be difficult to prove.—E. P. BUTTERFIELD.

First Nesting of Grasshopper-Warbler and Chiffchaff near Bingley.

—To a lover of birds who has spent more than half a century in his leisure hours on moor and fell and in the woods which surround his native village, the occurrence of a fresh bird, especially for breeding purposes, is always an interesting event. Such an one occurred in this district last year (1915). Mr. S. Longbottom, of Bingley, under date of May 24th, 1915, wrote me that a Grasshopper-Warbler was building a nest in the Prince of Wales Park, Bingley, and another friend wrote about the same time informing me of the arrival of one near Hebden Bridge, but the nest of the latter was never found. I first heard this bird in Upper Wharfedale on the moor about forty years ago; previous to this it had been heard by two Bradford naturalists, Messrs. Carter and Firth, on the edge of the moor above Bingley, and a friend of mine, who now resides in California, formerly informed me of its occurrence near Thornton, Bradford, and it has probably occurred in two, if not three, other instances in this immediate neighbourhood; and in other parts of Airedale it is reported from Skipton, Leeds, and Adel (Nelson).

On May 30th Mr. Sam Longbottom, of Bingley, took me to see the Grasshopper-Warbler's nest mentioned above built in Prince of Wales Park. The nest contained five eggs and was built amongst tall grass, not quite so cunningly concealed as I had expected, in a rough part near the highway leading from Bingley to Eldwick, this part of the park being little used by the public. When we approached the nest the old bird flew off into an elderberry tree near by and crept stealthily away—more like a mouse than a bird—and never took long flights at a time, and these movements were repeated when I visited the nest on June 3rd, on which date the nest had six eggs. On June 12th the nest contained four young and two eggs, and on June 13th all the eggs were hatched, which took a little longer time in incubation than I thought would be the case. The young left the nest on June 23rd; one young bird actually left the nest on June 22nd.

After May 24th, when the bird or birds were building, Mr. Longbottom informed me that the bird ceased singing, and was not heard again until June 25th, when the park-keeper heard it again, but it ceased again after June 28th. On July 18th Mr. Longbottom found a second nest with six eggs within about forty yards from the first nest; four eggs were hatched on July 21st, and on July 23rd all the eggs were hatched out. On July 31st all the young left the nest,

and on the following day the male recommenced singing, but although Mr. Longbottom paid frequent visits almost to the end of August he did not hear its song again. The above record is interesting because it establishes the fact that this species, occasionally if not frequently, is double-brooded; and also for the fact that the male ceases to sing, at least during the incubation and rearing of its young, and the short period between the commencement of the nest and the young leaving the nest. It seems strange that after two broods were hatched and got off at Bingley last year, the bird should be absent altogether from the district this year (1916), but after all this is only in accordance with what we know of its habits in other parts of its range in Britain. In Yorkshire it is erratically and but sparsely distributed, nowhere abundant or even common for many years in succession except in a very few localities.

The Chiffchaff is such a common and general breeding species in England that most ornithologists may be surprised that the fact should be recorded here, but the first instance of this species nesting in this district came to my notice on June 14th last. Mr. Longbottom, of Bingley, came to my Eldwick home on the 11th instant, and said he had heard what he took to be a Chiffchaff singing in Sir James Roberts' park near Saltaire, about half-a-mile away, and wished me to go and confirm or otherwise his determination. Of course I went immediately, and we did not wait long before I both heard and saw the bird, which was undoubtedly a Chiffchaff. It was singing on the edge of the park, and Mr. Longbottom had been listening to its song and trying to find its nest for three hours, but had not succeeded, and we both tried for over an hour without success and then left. On June 14th I met Mr. Longbottom again by appointment at the same place, and he informed me that the Chiffchaff was not singing so freely at its old quarters, but had shifted about a hundred yards away and had been singing mostly nearer the north lodge. On visiting the north lodge entrance the male bird was singing, and on watching the bird for some ten or twenty minutes the female appeared, and on looking over soon after I saw the female with some building-material in her mouth, which she took to a spot covered by ivy about six yards from our position. We waited some, perhaps ten, minutes, and she was taking building-material every few seconds. On June 16th I went to the nest, which was complete but contained no egg. On June 18th the nest had one egg, on the 21st four eggs, and on the 25th five eggs, its full clutch, I presumed. The nest is larger than a Willow-Warbler's with a larger hole for entrance, and is not so artfully concealed. I think this must

be this bird's second nest. Possibly its first nest might have been somewhere near where it was singing on the 11th instant. This is the first instance I have known of its nesting in this immediate neighbourhood. I have several times met with it here on migration in early April, and I have heard it singing in the breeding season, but once only, near Barden Town in Wharfedale; and once a boy brought me a clutch of eggs which he said he had taken in Bingley Wood, which looked very like those of a Chiffchaff. In North-west Yorkshire it is an extremely rare breeding species, in many other parts of Yorkshire it is moderately common, and in some places it may be said to be quite numerous.—E. P. BUTTERFIELD.

Further Notes on Newton's Statements on Birds.—Referring to Mr. Harvie Brown's remarks (see 'Zoologist,' p. 235, 1916), I fully agree in the main. I have always recognised that birds vary, and vary widely in some cases, in their habits in their distributional range, and what I have wanted to point out in my notes on Newton's great work, his 'Dictionary of Birds,' has been that Newton has not sufficiently recognised this fact, and consequently his statements are much too absolute in many instances.

To take one case mentioned by Mr. Harvie Brown. The Stonechat, he remarks, is a bird which we in Scotland may well designate "not uncommon, but locally dispersed, varying greatly in numbers and nowhere what can be called very abundant save in a few favoured localities in, say, 1900. But what it may be say ten, twenty, thirty, or more years later it is not easy to say!" In Newton's Dictionary it is stated that this species is a "conspicuous object on almost every furze-grown heath or common in the British Islands"—a statement which, I maintain, is not in consonance with what we now know of its status. In many, indeed in most parts of Yorkshire and other parts of Britain where there are furze-grown heaths or commons it is extremely scarce, if not altogether absent; and its status has not changed for the last forty, if not fifty, years. I think when Newton states that the Spotted Flycatcher seldom arrives in the British Islands before the latter part of May, this can only apply to a very limited portion of the area of Britain; and to a lesser degree these remarks apply to the arrival in its breeding-haunts of the Common Sandpiper. In most of the counties in England I think the Sandpiper will arrive before May. There are other statements made by the Professor which it would be dangerous to apply to the whole of Britain, such as his statement that the Swift is the swiftest-flying bird in Britain; and many of his statements regarding the habits of

the Cuckoo are not in accordance with well-known facts throughout its range in Britain.—E. P. BUTTERFIELD.

INSECTA.

Hornets in Church.—Sunday, May 21st, was a very hot day, and our morning congregation was rather disturbed by the appearance of three large Hornets, which had doubtless made the church their winter quarters. They were not very lively, and one was easily killed by a choir-boy and another by a devout lady in the nave, while the third was found dead in the church a few days later. A good many queen Wasps have been killed this spring, but the death of three queen Hornets is a matter for congratulation, and I am keeping a look-out for any other which may try to use our nest-boxes.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

NOTICES OF NEW BOOKS, Etc.

The Practical Principles of Plain Photo-Micrography. By GEORGE WEST. Dundee: Campbell & Sons. 1916. 4s. 6d. net.

This small work of Mr. West, who is Lecturer in Botany at St. Andrew's University, will commend itself to zoologists as well as botanists, since the microscope and the delineation of what it shows are equally necessary to them, and indeed, a couple of the photographic illustrations deal with subjects from the animal kingdom. Mr. West's style is racy and incisive, and we are glad to see that, while recommending a little-known and very simple system of camera-less photo-micrography, he does not claim a universal superiority for the photograph over the drawing; in fact, "Pen and pencil still ahead" is one of his characteristic side-headings to the discussion of this part of the subject. This exactly coincides with our own experience in the study of animals entire; we have found the photograph, though invaluable in some ways, tantalisingly lacking in detail, and therefore often most unsuitable for students. Elsewhere we are glad to see Mr. West rejecting the idea that nothing good in the way of scientific instruments can be made outside Germany.

ERRATA.—On p. 218, line 24, and 226, line 29, for *perchopterus* read *percnopterus*; p. 228, line 24, for *Cerbillus hurricanæ* read *Gerbillus hurrianæ*; and for *Mus muiculus* *M. musculus*.

